



THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re: Robert L. Payer, *et al.*

Serial No: 09/885,226

Group: 2839

Filed: June 20, 2001

Examiner: Patel, Tulsidas C.

For: Solid-Phase Welded Optical
Element Attach Process

Confirmation No: 4417

Date: November 28, 2003

#11/Ext 10/
Appeal
Brief
D. EVANS
12.16.03

APPEALANTS' BRIEF

Mail Stop Appeal Brief- Patents
Assistant Commissioner for Patents
P.O. Box 1450,
Alexandria, Virginia 22313-1450

Sir:

This is the Applicants' appeal from the final Office Action, mailed March 28, 2003 (Paper No. 8).

A one-month extension of time is requested for this response.

Real Party of Interest

Axsun Technologies, Inc. is the real party in interest.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of Claims

Claims 1-34 are pending in this application. Claims 27-34 are withdrawn from consideration. Claims 1-26 stand finally rejected pursuant to the outstanding Office Action.

Status of Amendments

All amendments have been entered. There were no post final amendments or proposed amendments.

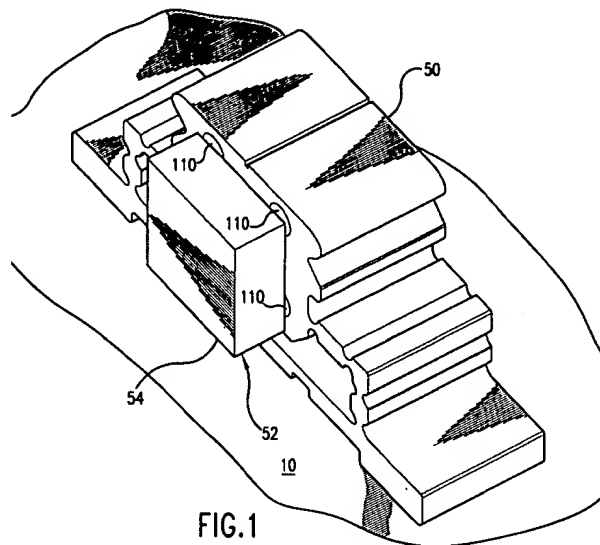
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Summary of the Invention

The present invention is directed to a micro-optical component, as shown in Fig. 1, for example:



This component includes an optical element 52, such as a lens substrate in which a lens is formed. A mounting structure 50 is used to attach this optical element to an optical bench 10.

According to the invention, the optical element is solid phase welded to the mounting structure. In the preferred embodiment, the element 52 is thermo-compression welded to the mounting structure 50.

Issues

Whether claims 5 and 18 are indefinite under 35 U.S.C. §112, second paragraph.

Whether claims 1, 2, and 5 are anticipated under 35 U.S.C. § 102(b) by U.S. Pat. No. 5,841,544 to Dautartas, *et al.* (Dautartas patent).

Whether claims 3, 4, 8-18 are unpatentable over 35 U.S.C. § 103(a) over the Dautartas patent in view of U.S. Pat. No. 5,888,841 to Synder (Synder patent).

Whether claims 6 and 19-26 are unpatentable under 35 U.S.C. § 103(a) over U.S. Pat. No. 5,815,616 to Bishop, *et al.*, (Bishop patent) in view of the Dautartas and Snyder patents.

Grouping of Claims

Claims 1-26 stand or fall separately.

Argument

Applicants respectfully believe that claims 5 and 18 are definite. The basis for the indefiniteness was the fact that it is not clear to the Examiner whether "'lens' recited in claim 1, is the same as 'lens substrate' recited in claim 5".

Claim 1 describes that the optical element includes a lens. Claim 5 requires that the optical element include a lens substrate.

These features are disclosed in the specification at page 5, line 18. There, it is stated that:

The exemplary optical element 52 comprises a substrate...In a more common example, a lens is formed in the substrate, such as a convex or concave lens.

In short, the lens is formed in the lens substrate in the description of the specification. The claims are consistent with that description since the optical element includes a lens substrate, physically, and a lens, functionally.

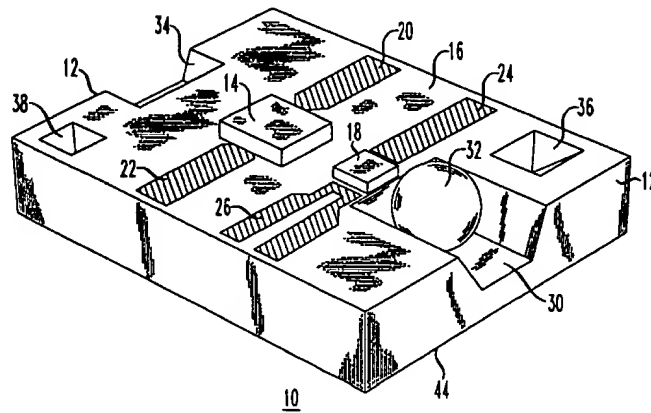
If the claims are descriptive and consistent with the specification, it is not clear to the Applicants how they could be characterized as indefinite.

Applicants respectfully believe that claims 1, 2, and 5 are not anticipated by the Dautartas patent.

Claim 1 is directed to the combination of an optical element and a mounting structure. The mounting structure attaches the optical element to an optical bench.

This claimed structure is not shown in the Dautartas patent. The Dautartas Fig. 1, for example, shows a ball lens 32 being solid phase welded directly to an optical bench 12 or platform.

FIG. 1



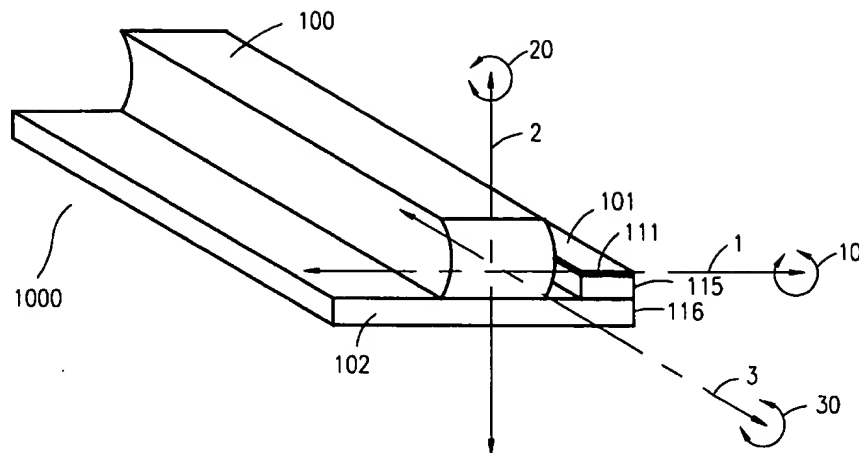
The Dautartas patent does not show or suggest the solid phase welding of the optical element to an optical bench via a mounting structure, as claimed.

Thus there can be no anticipation.

In a similar vein, Applicants respectfully believe that claim 14 would not be obvious in view of the Dautartas and Synder patents. Specifically, claim 14 requires an optical element, such as a lens, a mounting structure to which the optical element is solid-phase welded. The mounting structure is then solder bonded to an optical bench.

Again, the system disclosed by Dautartas patent does not include a mounting structure.

Moreover, the Synder system further does not disclose these features. In the Synder patent, a lens 100 is bonded to a carrier 102. The diode strip 101 is then bonded to the same carrier. Thus, the Synder system, similar to the Dautartas system, does not use a mounting structure for attaching the lens 100 to the carrier 102, for example.



The relevance of the present claimed invention arises from the fact that the solid phase welding can form a very robust joint against the temperature cycling associated with the solder bonding of the mounting structure to the optical bench. Thus, the optical element can be attached to the mounting structure, and then the mounting structure subsequently solder bonded to the bench while avoiding the optical element detaching from the mounting structure, since the solid phase welded joint is robust against the temperatures encountered during the solder reflow.

The rejection of claims 6 and 19-26 is premised upon the fact that the Dautartas patent disclosed an optical element being attached to a mounting structure by solid phase welding. As described previously, however, the Dautartas patent teaches that the optical element should be directly attached to the bench. The rejection of these claims is traversed based upon this distinction.

For the foregoing reasons, Applicants believe that the pending rejections should be withdrawn, and that the present application should be passed to issue. Should any questions arise, please contact the undersigned.

Respectfully submitted,

By 

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Date: November 28, 2003

Appendix

1. (previously amended) A micro-optical component, comprising:
an optical element, including a lens, for interacting with an optical beam; and
a mounting structure for attaching the optical element to an optical bench;
wherein the optical element is solid-phase welded to the mounting structure.
2. (original) A micro-optical component as claimed in claim 1, wherein the optical element is thermocompression bonded to the mounting structure.
3. (original) A micro-optical component as claimed in claim 1, wherein the optical element is thermosonically bonded to the mounting structure.
4. (original) A micro-optical component as claimed in claim 1, wherein the optical element is ultrasonically welded to the mounting structure.
5. (original) A micro-optical component as claimed in claim 1, wherein the optical element comprises a lens substrate.
6. (previously amended) A micro-optical component, comprising:
an optical element for interacting with an optical beam; and
a mounting structure for attaching the optical element to an optical bench;
wherein the optical element is solid-phase welded to the mounting structure
and wherein the optical element comprises a microelectromechanical device.
7. (previously amended) A micro-optical component, comprising:
an optical element for interacting with an optical beam; and
a mounting structure for attaching the optical element to an optical bench;
wherein the optical element is solid-phase welded to the mounting structure
and wherein the optical element comprises a Fabry-Perot tunable filter.
8. (original) A micro-optical component as claimed in claim 1, wherein the mounting structure is fabricated from a metal.

9. (original) A micro-optical component as claimed in claim 1, wherein the mounting structure is metal coated.
10. (original) A micro-optical component as claimed in claim 1, wherein the mounting structure is coated with a thermocompression bond metal.
11. (original) A micro-optical component as claimed in claim 10, wherein the bond metal comprises gold.
12. (original) A micro-optical component as claimed in claim 1, further comprising depositing bond metal bumps on the mounting structure.
13. (original) A micro-optical component as claimed in claim 1, further comprising depositing bond metal bumps on the optical element.
14. (currently amended) A micro-optical system, comprising:
 - an optical element, including a lens, for interacting with an optical beam;
 - a mounting structure, the optical element being solid-phase welded to the mounting structure; and
 - an optical bench, the mounting structure being solder bonded to the optical bench.
15. (original) A micro-optical system as claimed in claim 14, wherein the optical element is thermocompression bonded to the mounting structure.
16. (original) A micro-optical system as claimed in claim 14, wherein the optical element is thermosonically bonded to the mounting structure.
17. (original) A micro-optical system as claimed in claim 14, wherein the optical element is ultrasonically welded to the mounting structure.
18. (original) A micro-optical system as claimed in claim 14, wherein the optical element comprises a lens substrate.
19. (previously amended) A micro-optical system, comprising:

an optical element for interacting with an optical beam;
a mounting structure, the optical element being solid-phase welded to the mounting structure; and
an optical bench, the mounting structure being solder bonded to the optical bench, wherein the optical element comprises a microelectromechanical device.

20. (previously amended) A micro-optical system, comprising:
an optical element for interacting with an optical beam;
a mounting structure, the optical element being solid-phase welded to the mounting structure; and
an optical bench, the mounting structure being solder bonded to the optical bench, wherein the optical element comprises a Fabry-Perot tunable filter.
21. (original) A micro-optical system as claimed in claim 14, wherein the mounting structure is fabricated from a metal.
22. (original) A micro-optical system as claimed in claim 14, wherein the mounting structure is metal coated.
23. (original) A micro-optical system as claimed in claim 14, wherein the mounting structure is coated with a thermocompression bond metal.
24. (original) A micro-optical system as claimed in claim 23, wherein the bond metal comprises gold.
25. (original) A micro-optical system as claimed in claim 14, further comprising depositing bond metal bumps on the mounting structure.
26. (original) A micro-optical system as claimed in claim 14, further comprising depositing bond metal bumps on the optical element.
27. (withdrawn) A process for assembling an optical system, the process comprising:

solid-phase welding an optical element to a mounting structure; and then attaching the mounting structure to an optical bench.

28. (withdrawn) A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises thermocompression bonding the mounting structure and the optical element.

29. (withdrawn) A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises thermosonically bonding the mounting structure and the optical element.

30. (withdrawn) A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises ultrasonically bonding the mounting structure and the optical element.

31. (withdrawn) A process as claimed in claim 27, wherein the step of attaching the mounting structure to the optical bench comprises solder bonding the mounting structure to the optical bench.

32. (withdrawn) A process as claimed in claim 27, wherein the step of attaching the mounting structure to the optical bench comprises:

depositing solder material on solder mating surfaces of the mounting structure and the optical bench;
reflowing the solder material to join the mating surfaces.

33. (withdrawn) A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises coating weld mating surfaces of the optical element and the mounting structure with bond material.

34. (withdrawn) A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises coating weld mating surfaces of the optical element and the mounting structure with gold.